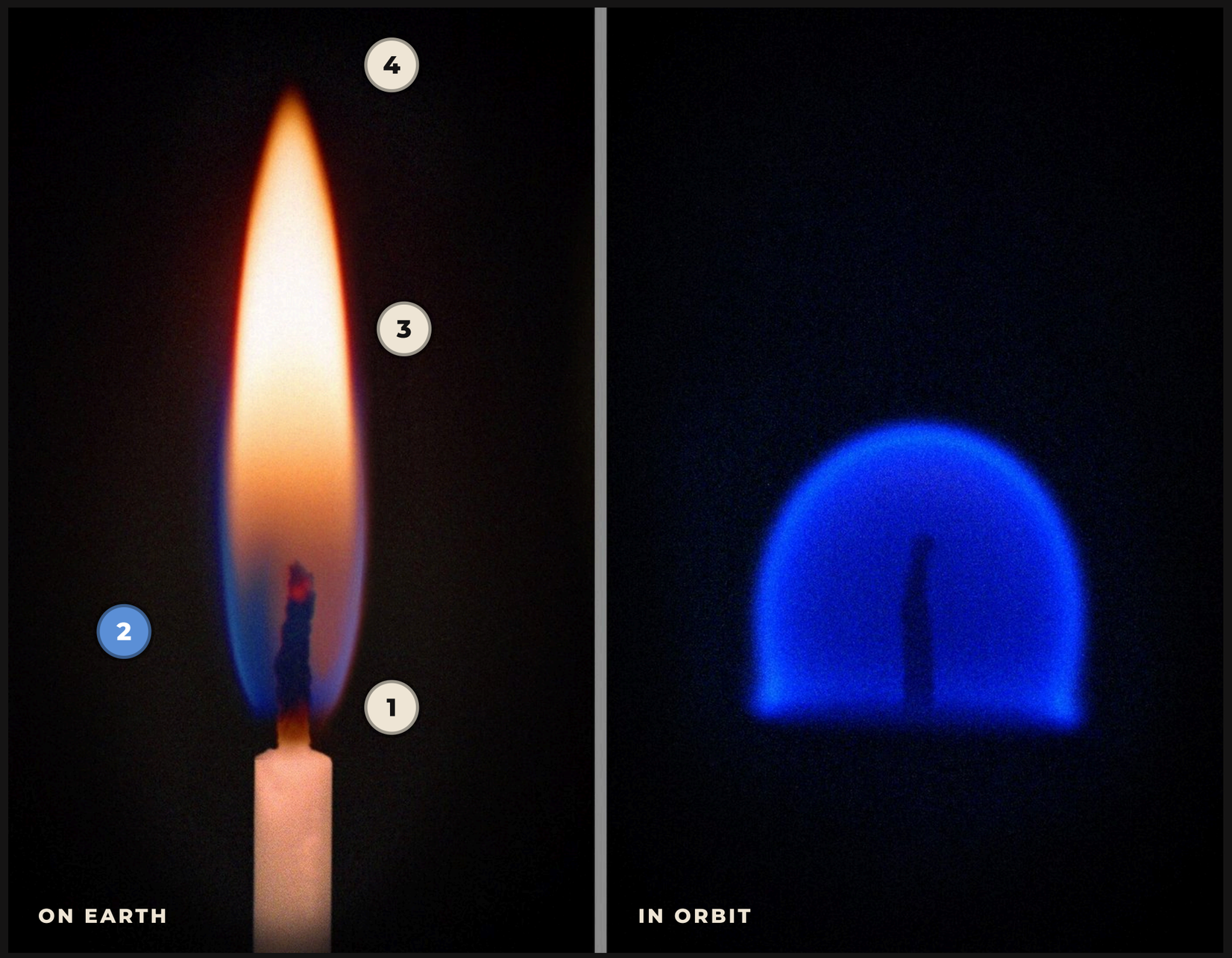
AQUARIAN ALCHEMY · THE FIRE ELEMENT

ANATOMY OF A FLAME: WHAT A CANDLE IS REALLY DOING

A flame is not a thing. It is a process.



1 · THE SELF-FEEDING LOOP
The flame's heat melts the wax. The wick draws the liquid wax up. Heat turns it into vapor. The vapor burns, and the heat melts more wax.

2 · WHY IS A FLAME BLUE?
At the base of the flame, a thin blue zone glows with light given off by energized molecules as fuel and oxygen react.

3 · WHY THE YELLOW IS YELLOW
The bright yellow body of the flame is tiny particles of soot glowing from the heat, like countless microscopic filaments.

4 · WHY A FLAME POINTS UP
Hot gas rises and pulls fresh air in from below, drawing the flame into its teardrop shape. In space, without gravity to drive that flow, a flame becomes a small, dim blue sphere.

IN ORBIT
The photo on the right: without gravity to drive the flow of hot gas, the flame becomes a small, dim blue dome. Photos: NASA.

IS FIRE A PLASMA?
Mostly no. An ordinary flame is a zone of hot, reacting gas. Only very hot flames contain enough charged particles to be called plasma.

The shape people have contemplated for thousands of years is a portrait of Earth's gravity.

SOURCES

Faraday, The Chemical History of a Candle (1861).
ChemistryViews; University of Bristol School of Chemistry: candle flame chemistry.
NASA Scientific Visualization Studio: flames in microgravity.

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